

**COLORADO DEPARTMENT OF HEALTH COMMENT RESPONSES  
DRAFT FINAL, RFI/RI WORK PLAN  
400/800 AREA  
OPERABLE UNIT NO. 12**

**LETTER COMMENTS**

**CDH-L1**      Discussions of specific IHSSs in Sections 2 and 6 (and Table 6.1) should be subdivided, as indicated, to improve clarity for work plan review and subsequent implementation.

**Response:**      IHSS discussions have been subdivided as requested.

**CDH-L2**      The staged approach alluded to in the work plan should be set forth formally in a manner comparable to the OU10 Work Plan.

**Response:**      The OU10 Work Plan was reviewed and the OU12 FSP has been reorganized and slightly revised to more closely resemble the staged approach in OU10. The stages outlined in this FSP are not identical to those in OU10, but reflect rationale discussed in past agency scoping meeting.

**CDH-L3**      The adequacy of the Field Sampling Plan (FSP) to address the Uranium Machine Tool Storage Area, Ingot Open Storage Area, the roof of Building 447, and the Sulfuric Acid Spill are questioned.

**Response:**      Specific inadequacies at the mentioned sites are inferred from other comments. Plans for these areas are described in Section, 6.0.

**CDH-L4**      The chromic acid release reported under UBC 444 should be included for investigation under this work plan.

**Response:**      The chromic acid spill in Building 444 will be addressed in D&D activities for Building 444, and the extent to which footing drains were impacted will be addressed in the proposed Technical Memorandum for the industrial area surface water, sediment, and footing drains. RCRA Contingency Plan Implementation Reports for the chromic acid spill are included in Appendix B. Chromic acid spilled onto the building floor, into the footing drains, and discharged to the water treatment plant.

**CDH-L5**      Determination of nature and extent of contamination, as well as obtaining data for a Baseline Risk Assessment, is to be a primary goal of the investigation (through a staged approach).

**Response:**      Comment noted. Text of the document reads accordingly.

**CDH-L6**      The exclusion of ground water from the site conceptual model is unacceptable and the model is incomplete.

**Response:**      The conceptual model has been revised as suggested by CDH.

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**CDH-L7**            **The HPGe grid spacing and instrumental capabilities are questioned.**

**Response:**        Additional technical information on the HPGe detector is appended to this document in order to address agency concerns discussed in OU12 work plan comment review meeting of August 27, 1992.

**CDH-L8**            **Soil sampling procedures and sample splitting requirements are unclear to inconsistent and must be referenced to an amended SOP GT.8.**

**Response:**        Soil sampling procedures have been clarified and made consistent throughout the revised document, and are referred to as amendments to SOP GT.8.

**CDH-L9**            **Rationales for sampling activities and methodologies should be described.**

**Response:**        The rationale for planned sampling activities and selected methodologies in Section 6.2 of the FSP.

**GENERAL COMMENTS**

**CDH-G1**            **The Phase I RFI/RI Work Plan for OU10 is the first workplan to be finalized in which an investigation of varied IHSSs within the industrialized portions of the plant is presented. While it is not necessary for the OU12 Work Plan to be identical to the workplan for OU10, please refer to the final version for guidance. There were lengthy sets of comments and long discussions that set many ground rules for investigations in the industrialized portions of the plant and there should be no reason to re-invent the same concepts. Any presentation technique in the OU10 Workplan that would enhance the clarity and/or brevity of this workplan should be incorporated.**

**Response:**        The OU10 RFI/RI Work Plan, which is focused toward defining sources of contamination and soil, was reviewed as guidance document in revising the field sampling plan for OU12. The OU12 FSP which is focused on defining nature and extent of contamination is designed in a similar, staged approach, as in OU10, although the number and frequency of formal technical memoranda are not as great. As agreed to by DOE and the agencies in scoping meetings, formal technical memoranda may not be required for each stage outlined in the OU10 work plan. Each technical memorandum proposed introduces review cycles that may cumulatively impact RFI/RI schedule, and their use should be applied to document primary decisions in RFI/RI Work Plan implementation.

**CDH-G2**            **The Division has repeatedly asked for a revision to SOP GT.8. The inconsistencies within the work plans for OUs 10, 11, 12, 13, and 14 for soil sampling reinforce the need for this revision. Inconsistency is also present in the HPGe programs and we have only been assured**

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that an SOP is "under development." Unless and until SOP GT.8 is amended and an HPGe SOP is developed and both are approved, the Division will be unable to judge the adequacy of the FSP and will not approve the workplan.

**Response:** A Document Change Notice (DCN) has been prepared for SOP GT.8 which includes the procedures described in Section 6.4 for radionuclide and nonradionuclide sampling in paved areas, and nonradionuclide sampling in exposed soil areas.

Delays in preparation of the HPGe SOP have affected proposed FSPs for this and other OUs. Technical information on the operation, calibration, and data quality have been appended to this report, and contain information being drafted in the SOP.

**CDH-G3** This investigation must establish all of the parameters listed as requirements for RFI/RI Reports in the IAG - namely the nature, extent, concentration, and quantity of contamination as well as determination of the Baseline Risk Assessment. It is difficult for the Division to see how this can be assured given a vaguely defined staging of field sampling activities. Although the elements of a staged approach are evident, a clearer commitment to staging, comparable to OU10, is warranted. This should be very carefully planned to ensure that the IAG objectives are met.

**Response:** The FSP has been clarified to convey the multi-task approach proposed for OU12. The plan conveys the initial data to be collected, to define presence, or absence of contamination, and how that information guides effective and optimized placement of quantitative data, and provides guidance for the subsequent tasks presented in this work plan.

**CDH-G4** Portions of several of the OU12 IHSSs lie beneath buildings. Since these portions of the IHSSs cannot be investigated and evaluated, they will need to be monitored until the buildings are removed. Specifically, this means that a sufficient number of ground water monitoring wells will need to be installed to determine if any contaminated water migrates out of the unit. While monitoring of this type is not within the scope of the RFI/RI investigation, determination of the extent and location of any present or past release from the unit is within the investigation scope. Therefore, we urge DOE to consider how the FSP could be modified since the logistical implementation necessary to satisfy both of these concerns could be the same (i.e., installation of wells).

**Response:** If contamination is present under buildings, then it will be addressed in the D&D program. OU12 will investigate areas up to the building foundation but not include building surfaces such as the roof or materials on building surfaces such as paint. The FSP will not be modified as requested.

**CDH-G5** Each activity and sampling methodology proposed for use in this workplan needs to have a specific section of the text describing the rationale of each sampling strategy and preferred methodology. For example, it is not clear why the CDH soil sampling methodology is proposed for soil covered areas and the RFP grab method is proposed for soils beneath paved area. Not only should the work plan give instructions to the individuals who will ultimately

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implement the plan, but more importantly, it must demonstrate to the Division and EPA that the plan represents a sound design.

Response: Rationale for each activity proposed in the work plan is provided in Section 6.2. Methods proposed for each activity are also described and available SOPs referenced.

**SPECIFIC COMMENTS**

CDH-S1 Section 1.2. The first paragraph, page 4, refers to the Section 3 discussion of ARARs. Please revise the narrative to refer to the Benchmark concept that has been approved by CDH.

Response: Text has been revised accordingly.

CDH-S2 Figure 1-10. This figure does not depict the five mappable sandstones reported to be of the Arapahoe Formation but field mapped as Laramie Formation Sandstones (re: Section 1, page 21). A revised figure should reflect the latest interpretations on the stratigraphic assignment of the five sandstones with a caveat that the interpretation may change in the future.

Response: Figure 4-53 from the Phase II Geologic Characterization Report has been reproduced in Figure 1-10 of this Work Plan. This figure correlates the five mappable sandstones with the most recent interpretation.

CDH-S3 Section 2.1. The third paragraph, page 2, states that UBCs and PACs are not addressed in the work plan pending finalization of the HRR. Although some issues remain that may need to be addressed in the HRR quarterly updates, the HRR is final. DOE should consider which PACs may be logically and efficiently incorporated into this work plan versus their inclusion into potentially new operable units. (The Division, as specified in Section I.B.5 of the IAG Statement of Work (SOW), will review the HRR to determine whether DOE will be required to initiate new RFI/RI or amend existing RFI/RI Work Plans as specified by IAG, SOW, Section VI.A.)

Response: UBCs and PACs are not included in this work plan because they have not been formally added to OU12 using the procedures outlined in the IAG. The IHSSs to be investigated in the RFI/RI for OU12 are specified in the IAG. If appropriate, this work plan will be amended when a formal decision regarding PACs and UBCs is made.

CDH S-4 Section 2.1.1. The discussion of the West (IHSS 116.1) and South (IHSS 116.2) Loading Docks should be divided. The "back and forth" discussion of the two units is confusing. Although they are similar units, the knowledge of their histories is sufficiently different to warrant a separate discussion.

Response: Text has been revised to discuss 116.1 in its entirety first and then discuss 116.2 in its entirety.

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**CDH S-5**      Section 2.1.2. Discussion of the Cooling Tower Ponds should be subdivided. If necessary the discussion of IHSS location discrepancies may be included in Section 2.1 rather than redundantly in each new subsection.

**Response:**      Text has been revised in similar manner as described for comment no. CDH S-4.

In paragraph 3, page 6, reference is made to various solutions used by Dowell in cleaning the Building 444 cooling tower. DOE must present "process knowledge" information on the types of solutions used. The oily sheen reported for the East pond (first paragraph, page 7) is of particular concern. If any solvents were used in the cleaning process of either cooling tower, soil gas surveys will be required in the Field Sampling Plan (FSP).

**Response:**      Process knowledge for "typical" cleaning solutions has been included. Solvents have not typically been used to clean cooling towers.

**CDH S-6**      Section 2.1.3. In the second paragraph, page 7, Figure 2-12 is reported to be of a guardhouse. The photo, which is ineffectual, is of building 440. From the Division's perspective, a photo of IHSS 157.2 is not necessary. If a photo is included, it should be directed toward Building 444.

**Response:**      The text describing Figure 2-12 has been revised to accurately reference the north side of Building 440. The photo was included to emphasize that IHSS 157.2 has been expanded to include areas not originally under consideration in the original IHSS boundary. The area shown in this photograph is potentially affected by hydraulic oil and carbon tetrachloride spills, and is worthy of a photograph.

Reference is made in the first paragraph, page 8, to a ditch south of Building 444 where radioactivity levels were two and three times background. If possible, the locations of the soil samples should be shown on Figure 2-11 along with the corresponding radioactivity levels. If soil sample locations are unknown, the ditch should at least be labeled on Figure 2-11.

**Response:**      The locations and radioactivity levels from soils samples collected in 1954 are not available and cannot be placed on Figure 2-11. The assumed location of the ditch has been noted on Figure 2-11.

Reference is made in the second paragraph, page 8, to a uranium machine tool storage area. The location of the storage area should be shown on Figure 2-11. Was this storage area within the soil covered alcove on the west side of Building 444. If not adequately covered by the FSP for IHSS 157.2 additional sampling, i.e. surficial soil sampling, will need to be proposed.

**Response:**      The location of the uranium machine tool storage area has been included in Figure 2-11. The area currently is covered in its entirety by Building 460 and will not be investigated under the OU12 RFI/RI as of this date.

The May 1960 incident (page 8, bullet 1) by which depleted uranium was deposited to the roof of Building 117 has not been specifically addressed in the Field Sampling Plan. The ability of the HPGe survey to quantify levels of radioactivity atop the roof are suspect. The FSP

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must be amended to state that the HPGe can properly survey from the ground (doubtful) or be expanded to run HPGe on the roof of Building 447.

**Response:** Investigation of the uranium potentially deposited on the roof of Building 447 is more appropriately accomplished under D&D and has not been included in this work plan.

Regarding the third bullet, page 9, please include a copy of RFP Photograph 13676-10 in the work plan. This photo is of interest relative to the extent of IHSS 136.2.

**Response:** RFP Photograph 13676-10 is included as Figure 2-12. Another photo of interest regarding the pond is RFP Photograph 13677-08, included as Figure 2-10.

Regarding the second bullet, page 10, a further effort beyond the HRR is warranted to locate the vent pipe, gutter and the general area of release of process liquids to the ground or paved surfaces. Once determined, the FSP relative to IHSS 157.2 must be reviewed to determine its adequacy. The statement that paint may have been used to contain radioactive materials may help focus the search for the area of release. Moreover, the paint should be sampled given the potential for erosion or blistering of the paint to allow escape of radioactive materials. Soil sampling should be proposed at potential hot spots even if it is to confirm HPGe results.

**Response:** The FSP relative to IHSS 157.2 currently covers all of IHSS 157.2, with respect to the initial screening tasks. Any anomalies detected, including any resulting from a vent pipe overflow, will be detected by the FSP presented in the work plan. Paint sampling will be included in the D&D process (see comment no. CDH-G4).

**CDH S-7** Section 2.1.5. Discussion of the Fiberglassing Areas should be subdivided to provide clarity.

**Response:** Text has been revised in similar manner as described for comment No. CDH S-4.

**CDH S-8** Section 2.1.7. Please remove all unnecessary references to IHSS 147.1 from the document except to note its transfer to OU9.

**Response:** Document has been revised accordingly. A short description of IHSS 147.1 has been retained in Section 2.1.10 in order to explain the transfer of this IHSS to OU9.

**CDH S-9** Section 2.1.8. The chromic acid release reported under UBC 444 in the first paragraph, page 21, appears to be a significant event that should be investigated within this RFI/RI. The Division believes that its passage into the sewage treatment plant, via the footing drains, warrants its investigation at this time despite its designation as an UBC. Please propose an acceptable FSP for this site. (Footing drains have been discussed in the work plan as possible routes of contaminant migration; however, for this incident, and all other IHSSs in this OU, the FSP does not specifically target investigations to or below footing drains. Why?)

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Response: Under building contamination will be addressed during D&D activities (see comment no. CDH-G4). Footing drain investigations will be included in the industrial area-wide FSP currently proposed by DOE.

CDH S-10 Section 2.2.1.2. Please revise this section to reflect the current status of the HRR.

Response: Entire document has been revised accordingly.

CDH S-11 Section 2.3.1. Regarding the third paragraph, page 29, EPA has determined that well 15889 is incorrectly located. Please revise all text and maps affected by this discrepancy.

Response: Well 15889 is no longer included in the OU12 work plan. The location of 15889 is west of the OU12 boundary. Figures and text dealing with 15889 have been revised accordingly.

CDH S-12 Section 2.3.2. Regarding the first paragraph of this section, discharges from Pond C-2 are currently directed to the Broomfield Diversion Ditch such that neither Woman Creek nor Standley Lake receive water from Pond C-2.

Response: Text has been revised accordingly.

Regarding the second paragraph, page 35, it is stated that "Available analytical data collected during sitewide monitoring of these and other footing drains and sumps will be obtained during the RFI/RI and evaluated." What specific sitewide monitoring includes footing drains and sumps? Which drains and sumps specific to this OU are of value? Monitoring locations of footing drains and sumps should be shown in the work plan to allow the Division to determine the adequacy of the FSP.

Response: Monitoring locations and available data from footing drains and building sumps within OU12 are presented in Appendix C. Sampling programs for the drains and sumps are currently proposed to be included in the industrial area-wide FSP.

CDH S-13 Section 2.4.2.2. In the first paragraph, page 49, the comparison of PU-239 with the isotopic mixture of PU 239/240 should be avoided. DOE may need to find or determine the background data expressed in terms of the same isotopes as the measured OU data.

Response: Text has been revised accordingly.

Near the end of the first paragraph, page 49, tritium concentrations for soils are compared to the upper tolerance limit of 410 pCi/l. Should this be pCi/gram?

Response: Text has been revised to pCi/g.

CDH S-14 Section 2.5.1. The statement is made that "it is unknown if ground water has been historically impacted." Without wells specific to OU12, it is difficult to "know" that OU12 IHSSs impacted

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the groundwater; nevertheless, the analytical data from nearby wells suggest a possible, if not probable, impact. It is reasonable to assume that an impact has occurred such that implementation of the FSP can provide a specific knowledge, pro or con. It is therefore inappropriate to exclude ground water from the conceptual model (i.e., Figure 2-39).

Response: Figure 2-39 has been revised to include ground water in the conceptual model as a potentially historically impacted media.

**CDH S-15**      **Section 2.5.4.** Gathering data to support a BRA is a primary goal of the RFI/RI, but not the only primary goal. An RFI/RI must also be designed to determine nature of extent of contamination. If the BRA is based on an incomplete assessment of nature and extent, the subsequent comprehensive BRA may be flawed if based on understated contamination levels.

Response: Text has been revised to reflect the goal of determining the nature and extent of contamination in order to preform the BRA.

**CDH S-16**      **Figure 2-3.** An additional drain was found during a June, 1992 visit to the site in the vicinity of the photo vantage point. Please add this to the figure and also to Figure 2-7. The two footing drains currently shown on Figures 2-3 and 2-7 were also found to be further east than depicted. They are located in the soil areas on each side of the loading dock driveway. Please revise.

Response: The drain locations have been revised on figures based on the June 1992 site visit. Drain grates for two older storm water drains were observed on the edges of the exposed soil area near the driveway. The drains were filled with soil and debris. They are thought to be old storm drains, not footing drains as suggested in the comment.

**CDH S-17**      **Figure 2-5.** The concrete abutment is approximately one foot wide, three feet high and is immediately adjacent to the west side of the dock with a short southward extension beyond the dock.

Response: Figure 2-5 has been revised accordingly.

**CDH S-18**      **Figure 2-9.** The eastward extension of Building 444 is designated Building 445 as observed during the June site visit.

Response: Figure 2-9 has been revised accordingly.

**CDH S-19**      **Figure 2-13.** The June site visit has confirmed that the photo vantage point for Figure 2-17 is incorrect. The correct vantage point is northeast of Building 452 looking due south.

Response: Figure 2-13 has been revised accordingly.



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**CDH S-20**      **Figure 2-39.** The exclusion of groundwater from the Site Conceptual Model is unacceptable. A primary goal of this RFI/RI is to determine if ground water has been impacted. Given the potential for impact, the pathways must be set forth in the flow chart. Attached to these comments is a revised version of Figure 2-39 showing the Division's thoughts on an acceptable flow chart. Please contact the Division with any questions or comments on this issue prior to submittal of the Final Work Plan.

**Response:**      Figure 2-39 has been revised accordingly.

**CDH S-21**      **Section 3.0.** This section must be revised to fully reflect the change from ARARs to Benchmarks. Currently, the discussion of benchmarks does not begin until page 4 of the section. Prior to revision, please refer to the Division's letter of June 12, 1992 on Chemical-Specific Benchmarks Tables (re: Gary Baughman, CDH to Martin Hestmark, EPA with copy to Rich Schassburger, DOE). Attachment A of the letter provides our guidance on the key points of benchmarks to establish detection limits and ARARs to establish cleanup standards.

Attached to our June 12, 1992 letter are comments to DOE's Chemical-Specific Benchmark Tables. Please revise, as appropriate, Tables 3.1, 3.2, and 3.3 of this work plan.

**Response:**      Section 3.0, including tables, has been revised accordingly.

**CDH S-22**      **Section 3.1.2.3.** The last sentence of page 6 should refer to PRGs in Section 3.2 not 3.2.5.

**Response:**      Text has been revised accordingly.

**CDH S-23**      **Section 4.1.3.** In the second paragraph of this section, pumpage and irrigation should be added to the text and also to the flow chart, Figure 2-39, as revised and attached.

**Response:**      Text and Figure 2-39 have been revised accordingly.

**CDH S-24**      **Section 4.1.4.** An RFI/RI is intended as a data gathering step toward a decision on whether remediation is necessary and, if so, the appropriate remedial alternatives. The text should be revised to reflect that Corrective Measures/Studies/Feasibility Studies (CMS/FS) and Corrective Action Decisions/Record of Decisions (CAD/ROD) are steps toward the final decisions.

**Response:**      Text has been revised accordingly.

The next to last bulleted item of page 7 supports the Division's call for the inclusion of ground water into the site conceptual model, Figure 2-39.

**Response:**      Figure 2-39 has been revised accordingly.

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Regarding the last paragraph of page 15, the Division notes that the FSP for IHSS 157.2 is based on a square versus triangular grid. Please explain why the triangular grid is not proposed for this IHSS.

Response: The surficial soil sampling grid is effectively proposed on a triangular grid at IHSS 157.2. Soil gas sampling locations are proposed on a 50 ft rectangular grid, although the screening methodology described in the plan includes additional points to be sampled midway between established grid locations where evidence of contamination is found. This provision would effectively create a triangular grid.

CDH S-25 Section 5.3.2. Regarding the third paragraph, page 6, minor changes in implementation of the work plan need only be reported in the RFI/RI report. This would include minor adjustments to screening and sampling locations warranted by site conditions. As conceptually agreed in the scoping meeting of April 6, 1992, DOE will submit screening data to the Division along with a rationale for proposed locations of soil borings and monitoring wells, etc. in lieu of a Technical Memorandum (TM). This will enable DOE to proceed on a fast-track, yet provide for Division input and concurrence. Once this stage of the work plan has been completed, revisions and additions needed to define nature and extent of contamination will necessitate a TM as correctly stated in the third paragraph.

Response: Text has been revised to state that minor changes in implementation of the work plan will be reported in the RFI/RI report, not in a TM, as originally stated.

CDH S-26 Section 6.0. DOE needs to clarify, in this section, that sampling will continued to the edge of any possible contamination anomaly, even if this is past the edge of an IHSS. This is necessary to establish the extent of any contamination as a stated objective of Section 4.0.

Response: Text has been revised to allow for sampling to the edge of contamination or to the point where another IHSS is encountered.

CDH S-27 Section 6.1. Regarding the second paragraph, page 2, one primary goal of an RFI/RI is to determine the nature and extent of contamination. Given the limited scope of the FSP, clearly one or more Technical Memoranda may need to be proposed, approved and implemented prior to DOE's issuance of the RFI/RI report. The subject paragraph should be revised to reflect such a commitment.

Response: Text has been revised to include the possibility for one or more technical memoranda.

CDH S-28 Section 6.2.1.1. Regarding the first paragraph of this section, the Division is concerned about a 195-foot field of view for each HPGe sample. This method may be appropriate for an area with uniformly distributed contamination but is likely to lead to erroneous data in an area like OU12 in which radionuclide contamination is more likely to be found in distinct hot spots resulting from historical spills or other discrete human activities. The assumption that "... radionuclide distribution is relatively homogeneous over the field of view, and that the distribution varies only with depth" is not likely to be the norm for this OU and is of major

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concern. DOE must demonstrate the ability of HPGe to both detect and locate hot spots with the proposed large grid spacing (100-foot centers - IHSS 157.2) or revert to a much smaller grid. (The Division notes that the proposed OU8 work plan HPGe stations are laid out on approximate 30-foot centers.)

**Response:** In order to define hot spots within the field of view of the HPGe detector, NaI probe locations have been added, tripod-mounted locations have been included, and the height of the vehicle-mounted HPGe can be varied to decrease the field of view. All of these items are presented in the text and on appropriate Figures in Section 6.0.

The proposed method will provide one data point, expressed in terms of pCi/g units for each survey point covering a 195-foot circle. This result will purport to represent the average radionuclide concentration over the area. The detector has no capability to determine the distance of a gamma source within the viewed area. Therefore, a hot spot immediately below the detector will result in a larger reported concentration than a hot spot at the edge of the field of view of the detector. Although the method may be valid for predicting radionuclide concentrations in soils in the upper soil layer for areas with uniformly distributed contamination, the use of such wide grid spacings in this type of OU is likely to provide results which are not consistent with actual soil concentrations.

**Response:** The field HPGe survey is used as a screening tool only. NaI probe locations have been included to provide more information over the field of view, thereby, identifying anomalous areas. The HPGe detector, when used as a screening tool, has the advantage of being able to identify specific isotopes. Additional technical information has been presented in Appendix G.

Regarding the development of a SOP for the HPGe, DOE needs to accelerate its efforts to prepare this SOP as indicated previously in the General Comments section. It is difficult to provide comments on procedures without the detailed procedures having been submitted. Furthermore, a SOP for the laboratory HPGe, assuming it will become available and approved for the work plan, must be developed.

**Response:** Both requested SOPs are under development by EG&G.

Regarding the last paragraph, page 5, surficial soil samples and depth profile samples must be randomly located to confirm both HPGe negatives and positives. Collecting samples at the HPGe stations does not provide a suitable level of confidence that HPGe results are accurate.

**Response:** Text has been revised to state that surficial soil samples will be collected on grid locations not associated with the HPGe locations. Depth profile samples will be collected at HPGe locations because they are going to be used to evaluate attenuation of radionuclides in soils.

Also, the use and reliability of a laboratory HPGe has not been demonstrated to the Division; therefore, it is inappropriate to substitute this technique for the standard radiochemistry lab analysis. At a minimum, lab HPGe results will need to be confirmed by a subset of radiochemistry lab analysis or documentation must be submitted that properly demonstrates lab HPGe accuracy and precision based on test results.

**Response:** Additional confirmatory-type samples have been included in the FSP to verify the HPGe results.

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Regarding the first paragraph, page 6, it is stated that "... more extensive programs of surficial soil sampling for radionuclides will be conducted in paved areas." Please clarify how the soil below the pavement is being given more extensive treatment than soil covered areas when the grid spacing is generally the same (note especially Figures 6-4 and 6-5). With depth profile samples not to be collected in paved areas, it appears to be even less extensive. Please acknowledge that radionuclides deposited before an area was paved may have moved downward to the same extent as in soil covered areas given the probability that they were attenuated at or near the surface. Sampling of the concrete and asphalt certainly do not constitute soil sampling and thus is not more extensive.

Response: Text has been revised to delete any reference to "more extensive sampling". Agree with comment and have revised text accordingly.

Regarding the second paragraph, page 6, please clarify the term offsite radionuclides and how they will be distinguished from onsite releases of radioactive materials.

Response: The term "offsite" has been deleted.

Regarding the last paragraph, page 6, please provide the status on availability of a lab HPGe in relation to the OU12 RFI/RI Schedule. Approval of the work plan as currently proposed will depend, in part, on the availability of this instrument.

Response: It is anticipated that the laboratory HPGe will be available in spring 1993 which is within the OU12 scheduled period to commence field work. This information has been added to the discussion.

CDH S-29 Section 6.2.3.2. Referring once again to the first paragraph of page 6, a 0-2" grab sample for paved areas is less extensive than a depth profile sample, i.e. 0-2, 2-4, 4-6". Please specify how the paved areas are receiving more extensive sampling.

Response: Text has been revised to delete reference to "more extensive sampling".

Also, please clarify whether the plug-type sampler or scoop sampler are equivalent to those described in Sections 6.3 and 6.2, respectively, of SOP GT.8. The Division has previously noted weaknesses in GT.8 and has specified that it be modified (OU11 comments May 8, 1992); consequently, references to soil sampling techniques must be precise by name and procedure number (e.g. Section 6.3) pending revision of GT.8. Also in keeping with the soil sampling procedures of OU11, the sampling of unpaved areas should use the meter square template approach and collect five subsamples at each surficial soil sampling station. This procedure should be applied whether CDH 1/4-inch sampling or RFP grab sampling is being employed. Given both the difficulty of access and the decreased potential for disturbance, sampling beneath paved surfaces may be limited to one sample versus five subsamples. (Please note: The Division still expects that SOP GT.8 be updated to reflect the meter grid sampling protocol.)

Response: Surficial soil sampling procedure techniques have been clarified in this FSP and include the one square meter template approach. A DCN is currently being prepared to address procedures

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for grab sampling below pavement, and composite sampling for nonradionuclides in exposed soil areas.

**CDH S-30**      Section 6.2.3.3. Regarding the last paragraph, page 11, the Division requests that DOE attempt to prepare SOPs for vadose monitoring and leachability testing prior to the resubmittal date of this work plan.

**Response:**      SOPs are currently under development and will be submitted when prepared. Vadose zone monitoring and leachability testing will not occur prior to approval of these SOPs.

**CDH S-31**      Section 6.3. Consistent with our comments on Section 6.2.1.1, the statement on page 14 that "... where HPGe measurements are representative of radionuclide activities in soil, minimal numbers of confirmatory surficial soil and depth profile samples will be collected." DOE must show that the HPGe measurements are representative before this statement will be accepted. Hot spots must be capable of being identified. Note that Section 6, page 39, admits to "moderate area averaging" when describing the capabilities of the HPGe system.

**Response:**      NaI probe locations have been added to supplement the HPGe survey locations and delineate the location and size of hot spots. Additional depth profile samples have been added to delineate the attenuation of radionuclides in soils.

Regarding the last paragraph, page 16, the Division acknowledges the difficulty of determining the grid required to meet a strict statistical objective. However, the Division expects that the data obtained through implementation of the FSP will allow DOE to determine the level of sampling needed to achieve a 95 percent confidence level. Viewed as a staged approach, the FSP as proposed should support subsequent rounds of sampling within the time frame of the IAG schedules. DOE should prepare a budget which assumes a staged approach. Additionally, the Division requests that DOE revise the work plan to clearly show a staged approach and potential investigation activities comparable to the OU10 RFI/RI Work Plan. To develop greater consistency among work plans of the industrialized area of RFP, DOE should determine the relevant need, based on screening data (Stage 1), for lysimeters and BAT sample collection techniques. Additionally, the applicability of the Sodium Sampling Probe Radiation Survey to this OU should be considered.

**Response:**      A multi-task approach has been developed for OU12 in a similar manner as OU10. NaI probe locations have been added to supplement the HPGe survey. The need for lysimeters or other vadose monitoring equipment is determined after evaluation of screening data. Ground water screening samples are proposed in the plan as a screening activity, the conduct of which depends on results of surficial and subsurface soil screening.

Regarding the second paragraph, page 18, please specify the source of the 90 percent/90 percent protocol for reporting an IHSS to be clean. The Division's policy is that IHSSs where 95 percent of a population falls within two standard deviations of mean background will be considered clean.

**Response:**      Text has been revised accordingly.

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CDH S-32      Section 6.3.1. The surficial soil sampling program planned for IHSSs 116.1 is unclear in more than one respect. Will the CDH, modified RFP or vertical profile sampling approach be used? The CDH approach is specified for a similar surficial soil sampling effort at IHSS 136.2.

Response:      Clarity has been added to Table 6.1, text, and Figure 6-2. Surficial soils will be collected using the CDH method. With respect to IHSS 136.2, surficial soils will be collected using the CDH method and depth profile will be collected using a plug type sampler.

Furthermore, the first paragraph, page 21, states that "To verify results obtained from the HPGe detector, two surficial samples will be split and sent to a laboratory for radionuclide analysis." Contrast this, please, to footnote "b" of Table 6.1 where three surficial soil samples and three depth profile samples will be submitted to the laboratory for radionuclide analysis. The Division cannot discern the method of sample collection for the surficial samples (CDH or RFP), whether two or three samples are proposed, and whether the footnote "b" surficial samples are to be split or to be analyzed by the laboratory HPGe instrument versus conventional methods. References to the appropriate SOP, and as necessary to the specific section of the SOP, must be made. Additional SOPs, or further revision of existing SOPs, may be warranted.

Response:      Text, figures, and Table 6-1 have been clarified. Several verification surficial soil samples have been added to IHSSs other than 136.2.

It appears that footnote "b" may have been intended for IHSSs 120.2 and then been inadvertently applied to this IHSS. (The discussion of IHSS 120.2 sampling and analysis is clearer but could benefit from some modification.) DOE should very carefully consider the apparent discrepancies between Table 6.1 and the narrative, further define the SOP method for surficial sampling, and define the specific laboratory method.

Response:      Table 6.1 and text has been revised extensively. The numbers and types of samples agree on the figures, Table 6.1, and in the text. The SOP method for surficial soils is found in SOP GT.8 as stated in the text.

Lastly, DOE should discuss the specific rationale for splitting samples. Are both splits being analyzed, if so, how? Is one simply being retained for possible verification?

Response:      "Split samples" should have read "duplicate samples". Text has been revised. Both samples in a duplicate will be analyzed for QC reasons.

Regarding the discussion of ground water elevations, third paragraph, page 22, how will seasonal variations in the water table be monitored if the top of the screen is placed two feet above a fluctuating water table?

Response:      Text has been revised to state that the top of the screen will be placed eight feet above the water table to account for seasonal fluctuations.

Is sampling proposed as a one time event or will the wells be turned over to a sitewide program for periodic monitoring and sampling?

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Response: Monitor wells will be sampled quarterly for one year. Only the first quarter results will be reported in the RFI/RI report. Subsequent quarters will be reported in TMs or as part of the ongoing monitoring program at the RFP. This information has been added to the document.

CDH S-33 Section 6.3.2. The comments to Section 6.3.1 on surficial soil sampling are applicable to IHSS 116.2.

Response: The text, figures, and portion of Table 6.1 that deal with IHSS 116.2 have been extensively revised. Surficial soils will be collected using the CDH method for radionuclide analysis. See response to CDH-32.

CDH S-34 Section 6.3.3. The comments to Section 6.3.1 on surficial soil sampling are applicable to IHSS 136.1.

Response: See response to Comment No. CDH S-32 and S-33.

Referring back to the Division's comments on Section 2.1.2, DOE must consider process knowledge to establish the potential for volatile organic solvents and the need, if any, for soil gas surveys at IHSS 136.1 (and also IHSS 136.2).

Response: Reference material discussing the types of solutions typically used to clean cooling towers has been added to the text and Section 11.0.

If possible, please include in the work plan a copy of an aerial photographic mosaic for the West Pond. Regarding the third paragraph, page 25, since Building 447 was in service prior to the West Pond and presumable is depicted in the aerial photo, please amend the West Pond location and, accordingly, the FSP. The Division does not wish to perpetuate an inaccurate location.

Response: IHSS locations have been revised to reflect the final HRR locations. Consequently, the appropriate FSPs have been revised. An historical photograph showing the West Pond has been included in Section 2.

Regarding the second paragraph, page 26, the use of colorimetric screening methods for hexavalent chromium concentrations is acceptable for targeting contaminant hot spots for further investigation. However, a colorimetric detection level of 0.1 milligram (100 ug/l) does not support the Benchmark Values of Table 3.2 and 3.3 at 50 ug/l. If hexavalent chromium is not detected in any sample, DOE must still ensure that levels to 50 ug/l are detected by CLP analytical methods.

Response: The use of colorimetric screening methods is proposed to determine presence or absence of chromium in ground water, and to efficiently place soil borings, samples from which are analyzed by CLP analytical methods.

CDH S-35 Section 6.3.4. According to Figure 6-4 and the June site visit, the area west of the security fence is asphalt paved not soil covered. Is there an impact on the FSP?

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Response: Figure 6-5 (previously Figure 6-4) shows asphalt paving in the area west of the security fence. No impact on the FSP.

Regarding the third paragraph, page 27, it is somewhat difficult to visualize how the drainage ditch could have been identified as a pond from aerial photographs. Was there actually a pond or did Dowell merely allow the cleaning solutions to escape via the ditch? Unless a pond, without a discharge point, can be confirmed, DOE must include hydrologic probe and boring locations within the ditch downgradient from the IHSS.

Response: Historical photographs were obtained, and the most representative of 136.2 has been included in Section 2.0. The photographs show a small ponding area without a discharge point.

A nested tensiometer station is shown on Figure 6-4. Please refer to the tensiometer in a manner comparable to that given on page 34 for the Fiberglassing Area (IHSS 120.1).

Response: Text has been revised accordingly.

CDH S-36 Section 6.3.5. Regarding the second paragraph, page 30, DOE states that "... a minimum of 38 surficial samples will be collected from alternating nodes on a 50-foot grid..." DOE should verify the radionuclide levels at non-node locations by redistributing a portion of the 38 samples and/or allocating additional samples.

Response: The FSP has been revised to include five more surficial soil sampling points, as well as depth profile, asphalt, and HPGe measurements for radionuclide concentration.

Please show tentative locations of the four concrete and asphalt core samples on Figure 6-5. This should lessen the chance of them being overlooked during plan implementation.

Response: Tentative locations have been included on Figure 6-1 for this IHSS.

Also, in the second paragraph, eight surficial soil samples appears to conflict with footnote "b" of Table 6.1 (see comments to Section 6.3.1).

Response: Table 6.1 has been extensively revised to accurately reflect the text and figures.

CDH S-37 Section 6.3.6. Reference is made on page 32 to the potential applicability of turbidimetric methods. The applicability of this, or any other method, should be determined before it is proposed in the work plan. If a determination is not possible at this time, an alternate method should be proposed. In either case, the appropriate SOP must be referenced or a SOP addendum proposed.

Response: The use of turbidimetric methods has been determined to be applicable to ground water screening and has been retained in the field sampling plan. SOP GW.5 has been referenced in the document as the applicable SOP.



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CDH S-38      Section 6.3.7. Regarding the third paragraph, page 33, the splitting of one surficial and one depth profile sample is more consistent with Table 6.1 footnote "b" than noted for the preceding IHSSs; however, one surficial and one depth profile sample are inadequate for laboratory analysis. A minimum of two samples each should be proposed for full radionuclide analysis.

Response:      Nine surficial soil samples are proposed for HPGe analysis and TAL metals analysis. Three depth profile samples are proposed at IHSS 120.1.

CDH S-39      Section 6.3.8. Regarding the first paragraph, page 35, this is the clearest discussion of the radionuclide sampling and analysis program; nevertheless, it too is not fully consistent with footnote "b".

Response:      Table 6.1, including the footnotes, has been extensively revised and matches the text and appropriate figures.

Based on the last sentence, first paragraph, page 34, it appears that the statement at the top of page 36 should read "four samples will be analyzed for TCL volatile organics, and three samples will be analyzed for radionuclides, i.e. volatiles should not be proposed twice for analysis.

Response:      Text has been revised accordingly.

CDH S-40      Section 6.3.11. Any stored hazardous waste or depleted uranium waste, if present, should be removed from this IHSS prior to sampling.

Response:      Text has been revised accordingly.

CDH S-41      Section 6.4.2. Please clarify HPGe's ability to detect plutonium. As an alpha emitter, plutonium is not directly determined by the HPGe method but must be estimated through some sort of equilibrium calculation. In reviewing the document "*In situ* Surveys of the United States Department of Energy's Rocky Flats Plant", (EG&G-10617-1129, UC-702, May 1991) we note the authors statement: "... it is often assumed that parent and progeny radionuclide of natural decay chains are in secular equilibrium in undisturbed soils. However, in most soils, secular equilibrium has been disturbed." This document made no attempt to determine plutonium concentrations in the surveyed areas but only reported Americium-241 concentrations. If equilibrium considerations are to be used to predict plutonium concentrations, the proposed calculation methods and factors must be described. Please add this information to the work plan.

Response:      Technical information in Appendix G indicates that a discrete energy is associated with plutonium, and the HPGe is, therefore, capable of determining plutonium concentrations.

The use of a laboratory HPGe detector is discussed in this section. What DQO Analytical Level does this provide, Level I, Level IV? Is the level adequate for the baseline risk assessment?

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Response: DQOs obtainable with the HPGe detector have been indicated as Analytical Level II or III. Regardless of the DQO level assigned, verification samples collected and analyzed using Analytical Level V methods will allow correlation of the HPGe results and use in the BRA.

CDH S-42 Section 6.4.3. The rationale for differentially sampling soils based on presence or absence of pavement must be discussed. Why is the CDH method proposed for non-paved areas while a 0-2 inch sample is proposed for soil beneath paved surfaces? The Division believed that for soil covered areas, a one meter grid template should be used to collect five composite samples for a 0-2 inch depth.

Response: Text has been revised in accordance with this comment. CDH method will only be used in exposed soil areas. Plug-type sampling to collect composite samples under pavement.

Reference to Technical Memorandum (TM) 5 of OU1 is unacceptable. Sampling crews should not be referred to other work plans or TMs. The procedures described in TM5 must be incorporated into SOP GT.8 or a SOP Addendum.

Response: A DCN for SOP GT.8 has been prepared which includes the information from TM5.

CDH S-43 Section 6.5.3. Table 6.3 lists the analytical parameters of interest, not Table 6.4.

Response: Text has been revised accordingly.

CDH S-44 Table 6.1. This table needs to be reorganized. Although the docks, ponds, and fiberglassing areas are physically and historically similar for each grouping, the FSP for each IHSS is not. The number of Samples/Borings need to be differentiated so that the Division can clearly see what DOE intends to do at each IHSS. The maps do provide some clarity, but the compounding of symbols tends to mask the frequency for each sample type. Also:

IHSS 120.1/120.2: Why is a Concrete/Asphalt sample proposed for IHSS 120.2 where there is less pavement than at IHSS 120.1 where the paved area is greater? Is it related to the radionuclide storage issue in Building 664?

IHSS 147.2: For the activities Surficial Soil and Depth Profile Samples, please show the No. of Samples, i.e. two (2) for each.

Please complete footnote "e" on page 6 of Table 6.1.

Response: Figures, text, and Table 6.1 have been revised extensively. IHSSs have been separated in the text and Table 6.1.

CDH S-45 Figure 6-3. Please note that four of the soil sampling locations shown are largely redundant to those shown on Figure 6.1 and need not be duplicated.

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Response: In general, the sampling locations have been revised. Any duplication and overlap has been avoided.

CDH S-46 **Figure 6-5.** The Ingot Open Storage Area is shown on the figure; however, surficial and depth profile soil samples are not specific to this potential area of contamination. Please demonstrate how the proposed IHSS 157.2 FSP is adequate or propose specific sampling activities.

Response: The FSP for IHSS 157.2 has been revised. Currently there is a surficial soil sample in the immediate vicinity of the ingot open storage area. In addition, several soil gas and two radiation survey points are near the ingot open storage area.

CDH S-47 **Figure 6-6.** The Division does not believe that the FSP for the IHSS 187 Sulfuric Acid Spill is adequate. Why are samples not proposed along the ditch and at the site of the spill impoundment to determine the full nature and extent of the release?

Response: The sulfuric acid was neutralized with lime almost immediately after the spill and is not persistent in the environment. Therefore, any affects of the spill will not be present at this date. Sampling at the source has been included with the caveat that if contamination is detected at the source, then additional sampling along the spill pathway will be performed.

CDH S-48 **Figure 6-8.** If the Surficial Soil/Depth Profile sampling locations shown are tentative, please indicate in the legend. If not tentative, please redistribute the sample locations from the southwest corner of the IHSS.

Response: Figure 6-9 (previously Figure 6-8) has been revised to reflect the tentative nature of the soil borings and nested tensiometer. Surficial soil locations have been distributed with emphasis on the entire IHSS.

Please show tentative locations for concrete/asphalt samples as specified on page 35, Section 6.0. This should ensure that the sampling will occur.

Response: No concrete/asphalt samples will be collected at IHSS 120.1.

CDH S-49 **Figure 6-11.** Please use HPGe at the corners and center of this IHSS for a total of five stations. Randomly distribute four surficial soil sampling stations over the IHSS.

Response: Seven HPGe locations are distributed over the entire IHSS providing complete coverage. Seven surficial soil samples have been at the HPGe survey locations.

CDH S-50 **Section 7.0.** Submittal of this work plan occurred on May 8, 1992, not March 8, 1992.

Response: Text has been revised accordingly.

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Regarding the last sentence, page 2, schedule revisions must be requested two weeks prior to a due date and be based on valid reasons, they are not automatic.

Response: Text has been revised to include the two weeks and the rationale for the schedule extension.

CDH S-51 Section 8.1. Parts B and C of the Risk Assessment Guidance for Superfund were released on December 13, 1991 (OSWER Directive 9285.7-01B and -01C) and should be referenced on page 3. These documents should be reviewed and, as appropriate, incorporated into this work plan.

Response: Text has been revised accordingly.

CDH S-52 Section 8.1.2. The onsite residential use scenario, third paragraph, page 5, cannot be excluded from the risk assessment based on DOE's future land use plans.

Response: Residential land use scenario will be included in the Baseline Risk Assessment.

CDH S-53 Figure 10-1. Please update the figure to include the current personnel assignments.

Response: Figure 10-1 has been revised accordingly.